SOCIAL-ECOLOGICAL SYSTEMS INSTITUTE
ANNUAL REPORT 2023

SESI
Social-Ecological Systems Institute

FACULTY OF SUSTAINABILITY
LEUPHANA UNIVERSITY OF LUENEBURG
GERMANY

LEUPHANA
UNIVERSITÄT LÜNEBURG

FOREWORD

This is the fourth year we publish our annual report, and it is another year where sensitive human beings might feel overwhelmed by the planetary situation. We sense this in our loved ones, students, team members, and ourselves. Being engaged in scientific endeavours related to biodiversity, climate change, environmental (in)justice, and working with communities who visibly suffer from the intertwined climate-biodiversity-justice crisis can easily trigger challenging emotions: grief, sadness, anger, or hopelessness. As social-ecological scientists, we are not exempt from experiencing such challenging emotions which, at the same time, are wonderful because they signal that we truly care. We care because we feel connected with non-human and human beings, we care because we are loving, compassionate beings.

We are tremendously grateful that the members of Leuphana's Social-Ecological Systems Institute act not only as rational scholars but openly care about current injustices against our Earth and vulnerable communities. As you will see when reading this report, our researchers do not only study social-ecological dynamics but also articulate the notion of 'inter-being' (Thich Nhat Hanh), do not only intend to understand the system but transform injustice, and do not only work together but create and nurture community.

The 2023 report covers the research, teaching and team highlights of our institute. It is testimony of the role of its members in building knowledge on interrelatedness, while being compassionate towards biodiversity and disadvantaged communities.

It is an honour to work with such 'response-able' and 'care-full' scientists.


Berta Martín-López & Joern Fischer
(Heads of the Social-Ecological Systems Institute)

Some of the social-ecological systems in Germany, Rwanda, and Bolivia in which SESI researchers work.

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ABOUT THE SOCIAL-ECOLOGICAL SYSTEMS INSTITUTE (SESI)

The Social-Ecological Systems Institute (SESI) was founded in 2020. It is part of the School of Sustainability at Leuphana University of Lueneburg, Germany. The institute provides a space for like-minded faculty members at Leuphana who are particularly interested in links between social and ecological phenomena. SESI researchers come from many different parts of the world, and a substantial proportion of SESI's research takes place outside Germany, including in Africa and Latin America. SESI researchers are interested in the ecological sciences, the social sciences, and especially the linkages between the two.

The SESI logo was inspired both by an unfolding fern leaf and by the Celtic double spiral – which symbolises the balance between opposing forces (e.g. change and preservation; or collapse and renewal). Arguably, many social-ecological systems are now on an unsustainable trajectory because they have lost this balance.

Leuphana University's central building.

VISION AND MISSION

OUR VISION

We envision a fair world where the benefits generated within social-ecological systems are shared sustainably with other species, both within and across generations. Solutions to sustainability challenges are developed collaboratively across diverse scientific disciplines, knowledge systems, and social interests.

OUR MISSION

To realise our vision, we recognise the need for transformative change. In pursuit of such change, we:

- Use place-based social-ecological systems thinking to understand and resolve sustainability challenges such as biodiversity loss and environmental injustice
- Bring together insights and approaches from the natural sciences, social sciences and the humanities in genuinely collaborative endeavours
- Integrate experiences, practices, and understandings from diverse knowledge systems
- Embed tools for transformative change into social-ecological systems thinking via a leverage points perspective
- Develop and apply methods to bridge multiple scales and governance levels
- Provide spaces for people sharing our vision to meet and exchange ideas.

RESEARCH HIGHLIGHTS

RESEARCH HIGHLIGHT: DFG RESEARCH GROUP "A SOCIAL-ECOLOGICAL SYSTEMS APPROACH TO ECOSYSTEM RESTORATION IN RURAL AFRICA"

Figure 1. An agroforestry landscape in western Rwanda (photo by Dula Wakassa Duguma).

Ecosystem restoration is a critical priority globally, not least because the United Nations declared 2021 to 2030 the “Decade on Ecosystem Restoration”. While a lot of restoration activities are taking place around the world, few research projects to date have examined ecosystem restoration from a social-ecological systems perspective. What works well in restoration, from a social perspective, from an ecological perspective, and how are the ecological and social dynamics of restoration influencing one another?

Late 2023 marked the start of a new research unit funded by the German Research Foundation and coordinated by Leuphana University Lueneburg, which will specifically approach ecosystem restoration from a social-ecological systems perspective. Rwanda was chosen as the study area because of its ambitious efforts in ecosystem restoration over the last decades. The research unit involves 20 core members from four different research institutions in Germany, as well as collaborations with many additional researchers (and other stakeholders) from Rwanda. From Leuphana, four professors based at or affiliated with SESI are involved (Joern Fischer, Berta Martín-López, Jacqueline Loos, and Vicky Temperton). They were awarded the Joint Prize at Leuphana University’s 2023

Dies academicus for outstanding scientific achievements, which have led to the acquisition of an excellent funding format.

Figure 2. Professors Vicky Temperton and Berta Martín-López at the Dies academicus ceremony.

The research unit will be working on eight sub-projects on the restoration of ecosystems in western Rwanda. These will tackle ecological questions, social questions, and questions about social-ecological dynamics. For example, research will investigate how restoration influences biodiversity and ecosystem functioning; how social restoration outcomes are shaped by governance arrangements, including effects on community cohesion or perceived equity and justice; and how local people's relationship with the landscape changes as a result of ecosystem restoration. In addition, a living lab will be established to co-create innovative types of restoration activities together with local stakeholders.

In December 2023, a kick-off workshop took place at Leuphana, and this marked the official beginning of the work. An ambitious agenda has been set for the following four years, including multiple PhD projects and workshops with government and NGO stakeholders in Rwanda. We look forward to reporting on the further progress of this research unit in future annual reports!

Figure 3. The nearly complete team of the research unit at the kick-off workshop – two newly hired members from Rwanda had not yet arrived in Germany, and two other members were sick and therefore could not attend.

FOR FURTHER INFORMATION:

Visit our website: https://ecosystemrestoration.net

References:

Fischer, J., Riechers, M., Loos, J., Martin-Lopez, B., & Temperton, V.M. (2021) Making the UN decade on ecosystem restoration a social-ecological endeavour. *Trends in Ecology & Evolution 36* (1), 20-28. DOI: 10.1016/j.tree.2020.08.018.

Frietsch, M., Loos, J., Löhr, K., Sieber, F., & Fischer, J. (2023). Future-proofing ecosystem restoration through enhancing adaptive capacity. *Communications Biology, 6*: 377. DOI: 10.1038/s42003-023-04736-y.

YOUNG RESEARCHER AWARD: DAVID ABSON – MAINSTREAMING SOCIAL-ECOLOGICAL SUFFICIENCY

Figure 4. Prof. Dr. David Abson, Professor of Szstainable Resource Use at SESI.

Prof. Dr. David Abson was awarded the Leuphana Young Researcher Award for his outstanding scientific achievements, which have led to the acquisition of an excellent funding format. The focus of Dave Abson's research is the problem that global production and consumption patterns are fundamentally unsustainable and thus threaten important processes on our planet that are essential for maintaining ecological functioning and the long-term survival of humanity. Under the question "What is enough?", a novel approach of socio-ecological sufficiency is developed, which aims at securing a socially satisfactory standard of living while using natural resources in an ecologically sustainable way. His outstanding achievements, in particular his internationally widely recognised publication activity, led to the acquisition of the globally renowned Consolidator Grant of the European Research Council (ERC).

The overall aim of MaSES is to mainstream the notion of social-ecological sufficiency as a conceptual and empirical bridge between research on planetary boundaries and sustainable production and consumption, with far-reaching academic and societal implications for sustainable resource use. The project is divided into a number of work packages (WP). WP1 will synthesize disparate approaches to conceptualizing sufficiency and cement social-ecological sufficiency as a core idea in sustainability thinking. WP2 will employ a global environmentally extended material and energy flow analysis to quantify key

planetary boundaries (land-system change, biochemical flows, climate change and freshwater use) in terms of 'ecologically sufficient' levels of household consumption. WP3 will adapt methods from consensual deprivation assessments to identify 'socially sufficient' levels of household consumption across different social groups. WP4 will assess the feasibility of different strategies for closing the gap between ecologically 'safe' and socially 'acceptable' levels of household consumption. WP5 addresses project management.

FOR FURTHER INFORMATION:

https://www.leuphana.de/en/institutes/sesi/sustainable-resource-use.html

https://www.leuphana.de/en/current-affairs/university-news/singleview/2023/12/19/new-at-leuphana-prof-dr-dave-abson-happiness-instead-of-waste.html

RESEARCH HIGHLIGHT: UNRAVELLING THE RELATION BETWEEN VALUES OF NATURE AND TELECOUPLING (VaNaTe)

Figure 5. Harvested timber (left) and rich-biodiverse grassland (right) in the Schwäbische Alb, one of the Biodiversity Exploratoratories.

Nature supports human wellbeing via multiple nature's contributions to people (NCP), for example by producing food, regulating air and water quality, or providing inspiration. Humans interact with nature to co-produce these NCP by using various anthropogenic capitals, such as knowledge or machinery. The sustainability of this co-production process depends on various factors. For one, research has shown that land-managers' choice of anthropogenic capitals depends on the NCP they prioritise and thus influencing how NCP are co-produced. Second, recent research has demonstrated how land-management decisions are influenced by the ways people value nature and its contributions. Third, anthropogenic capitals and the NCP they co-produce are telecoupled across geographical and temporal scales. This implies that some capitals and NCP may be sourced and used locally, whilst others are shipped from far away. The VaNaTe research project will expand on this research by understanding how people's values of nature and their contributions to people are interlinked with land-use intensification as well as sustainable land management.

VaNaTe is embedded in the long-term and large-scale DFG Priority Program Biodiversity Exploratories, which studies the effects of land-management on biodiversity in three case study sites across Germany: Schwäbische Alb, Hainich-Dün, and Schorfheide-Chorin (Figure 5). VaNaTe will contribute to the Biodiversity Exploratories by linking accumulated knowledge on land-management to the two most important societal drivers that underpin such management: value-systems and telecoupling of NCP co-production. VaNaTe is led by Prof. Dr. Martín-López (SESI, Leuphana), Prof. Dr. Loos (Institute of Ecology and SESI, Leuphana), and Dr. María Felipe-Lucia (Pyrenean Institute of Ecology,

Spain) and supported by Roman Isaac (PostDoc) and Anna Mayer (PhD student) at SESI.

FOR FURTHER INFORMATION:

https://www.biodiversity-exploratories.de/en/projects/unravelling-the-relation-between-values-of-nature-and-telecoupling/

RESEARCH HIGHLIGHT: GRASSWORKS - WHAT CONSTITUTES SUCCESS IN THE ECOLOGICAL RESTORATION OF GRASSLANDS IN GERMANY: A SOCIAL ECOLOGICAL AND CROSS-GERMANY PERSPECTIVE

Figure 6. Common Blue butterfly (Polyommatus icarus, Hauhechel-Bläuling in German) on bird's foot trefopil (Lotus corniculatus, Hornklee in German) (photo by Lea Pöllmann).

Unbeknown to many, species-rich grasslands are the most biodiverse terrestrial habitat on the planet (at small scales; e.g., the calcareous extensively managed grasslands of Romania; Wilson et al. 2012) providing a wide range of valuable ecosystem functions and services. At the same time, the proportion of permanent grassland has declined rapidly in recent decades, making it one of the most threatened ecosystems in the world. Germany is also experiencing a dramatic deterioration of grasslands (and is being taken to court by the EU for its lack of adequate care of such FFH grasslands) mainly due to changes in land use, lack of adequate protection or consideration, as well as increased nitrogen inputs, which have led to major losses of biodiversity. The recent studies by Jandt et al. (2023) and Staude et al. (2023) highlight the pivotal role that species-rich grassland restoration could play in bending the biodiversity curve, since the majority of plant species that have declined in Germany over the past 100 years are herbaceous species from such grasslands (especially the flashy forbs). Grasslands can store a lot of carbon, so their loss means decreased overall resilience towards the climate and the biodiversity crisis.

Figure 7. Juno Laschke, a PhD student in Grassworks at Leuphana, assessing which butterflies she has caught.

Within the Grassworks project we aim to achieve a better and more sustainable use of grasslands. We are investigating to what extent already restored grasslands were successful in their aims, from both an ecological and social-ecological perspective (see Fischer et al 2021 for an overview of such approaches). Additionally, we are working in real-world labs with local stakeholders to actively restore species-rich high nature value grasslands whilst also improving the connection of people to such grasslands (including livelihoods). Researchers from the fields of ecology, social science, sustainability science, environmental economics, and governance are working together with the German Association for Landcare Management (DVL; Deutscher Verband für Landschaftspflege) to better understand how and under what conditions restoration projects are successful (and when they are less successful). The project focuses on three model regions in North, Central and South Germany, which differ in their economic, social-ecological, and socio-economic conditions. The post-hoc work package has the ambitious goal of assessing a total of 180 restored grasslands across Germany: for each of the three model regions 40 existing restoration sites (already restored) along with 10 negative and 10 positive reference sites, each including their ecological, social-ecological, and socio-economic assessment. This is a highly unusual level of in-depth assessment

of restoration success (that also consider negative as well as positive reference sites for restoration), that is even more ambitious than the level of measures assessed in the German DFG-funded Biodiversity Exploratories. This means that we should end up with a very comprehensive and powerful dataset from which to integrate findings and make recommendations for future grassland restoration and policy making.

Figure 8. Prof. Jacqueline Loos from Leuphana and local stakeholders from NGOs, and local government agencies thinking hard about the different values they associate with grasslands at a workshop in February 2023.

In autumn 2023 we have successfully completed the very extensive and exhaustive ecological fieldwork that included measuring vegetation composition, height, butterflies, and wild bees as well as soil chemistry at each restored (and reference) grassland site. Now we are able to start assessing questions of whether the different organism groups respond differently to different restoration measures or previous land use or management (mowing, grazing) and the extent to which the different taxonomic groups and their biodiversity are useful indicators of overall biodiversity change through restoration measures. At the same time the social- and social-ecological scientists have also been busy interviewing and surveying the land managers and owners to find out what values are associated with such grasslands, and the socioeconomic framings that help define to what extent such species-rich

grasslands are values, conserved and restored, and how much of the general landscape they take up.

FOR FURTHER INFORMATION:

Visit our website: https://grassworksprojekt.de/en/

References:

Wilson, JB., Peet, R.K., Dengler, J., & Pärtel, M. (2012) Plant species richness: the world records. *Journal of Vegetation Science, 23*, 796-802. DOI: 10.1111/j.1654-1103.2012.01400.x.

Fischer, J., Riechers, M., Loos, J., Martin-Lopez, B., & Temperton, V.M. (2021) Making the UN decade on ecosystem restoration a social-ecological endeavour. *Trends in Ecology & Evolution 36* (1), 20-28. DOI: 10.1016/j.tree.2020.08.018.

Lyons, K.G., …, & Temperton, V.M. (2023). Challenges and opportunities for grassland restoration: A global perspective of best practices in the era of climate change. *Global Ecology and Conservation,* e02612. DOI: 10.1016/j.gecco.2023.e02612.

Jandt, U., … Haider, S. et al. (2022). More losses than gains during one century of plant biodiversity change in Germany. *Nature, 611* (7936), 512-518. DOI: 10.1038/s41586-022-05320-w.

Staude, I.R., Segar, J., Temperton, V.M., Andrade, B.O., de Sá Dechoum, M., Weidlich, E.W.A., Overbeck, G.E. (2023). Prioritize grassland restoration to bend the curve of biodiversity loss. *Restoration Ecology*, e13931.

RESEARCH HIGHLIGHT: MOVE'N'SENSE - SENSE OF PLACE AND MOBILITY IN CROSS-BORDER CONTEXTS – ESSENTIALIST AND PROGRESSIVE PERSPECTIVES

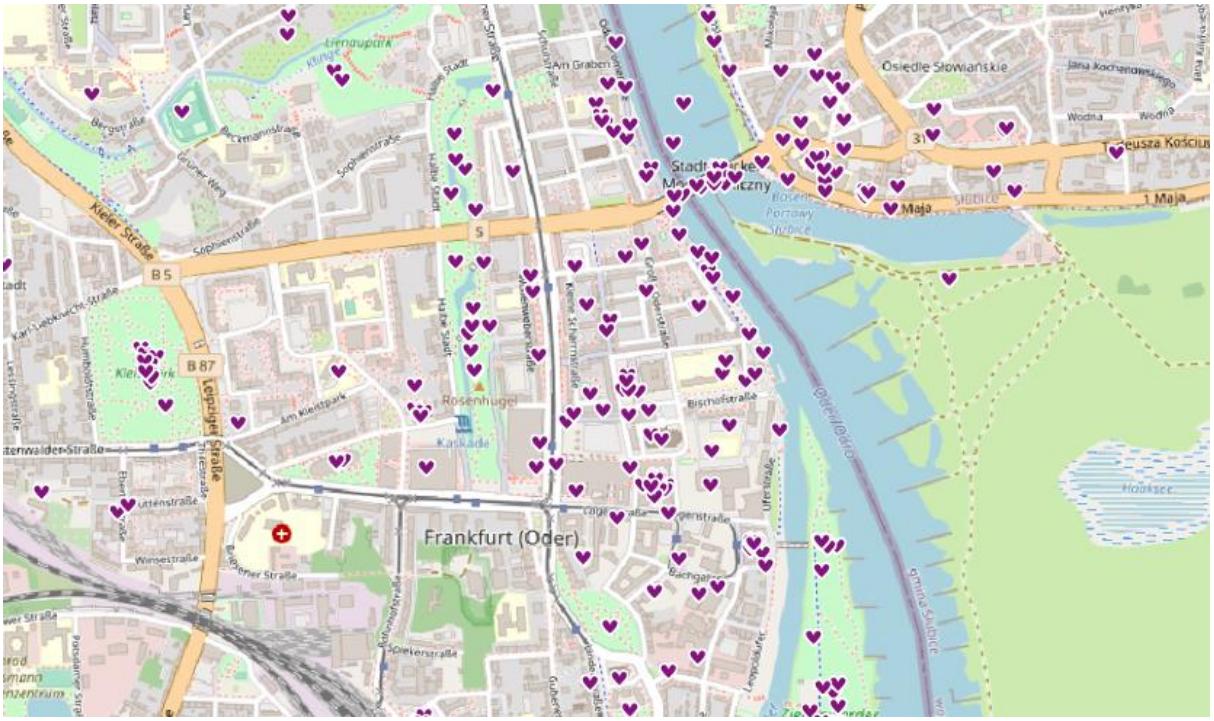

Figure 9. Participatory Mapping survey: Meaningful places in Frankfurt-O and Słubice.

In 2023 the second year of Move'n'Sense project started, funded by the German Research Foundation (DFG) and the Polish National Research Centre (NCN). The project initiated in January 2022, with expert interviews, and an international workshop on the topic of linking senses of place and mobilities. This year, 2023, we conducted a participatory mapping survey and focus groups with residents from the border regions. The project aims at exploring the relations between mobilities and senses of place in the context of cross-border regions. Furthermore, in close collaboration with local practice partners, we aim to integrate the knowledge into planning practices fostering environmental stewardship activities and sustainable (urban) landscape management.

Figure 10. Discussing first results during Citizen Picknick in Słubice, Poland.

In March, we visited the project region to disseminate a participatory mapping survey. Through local networks, media advertisement, randomly sent out postcards, and flyers and posters distributed at key locations, we invited local residents to share with us their place relations and mobility behaviours.

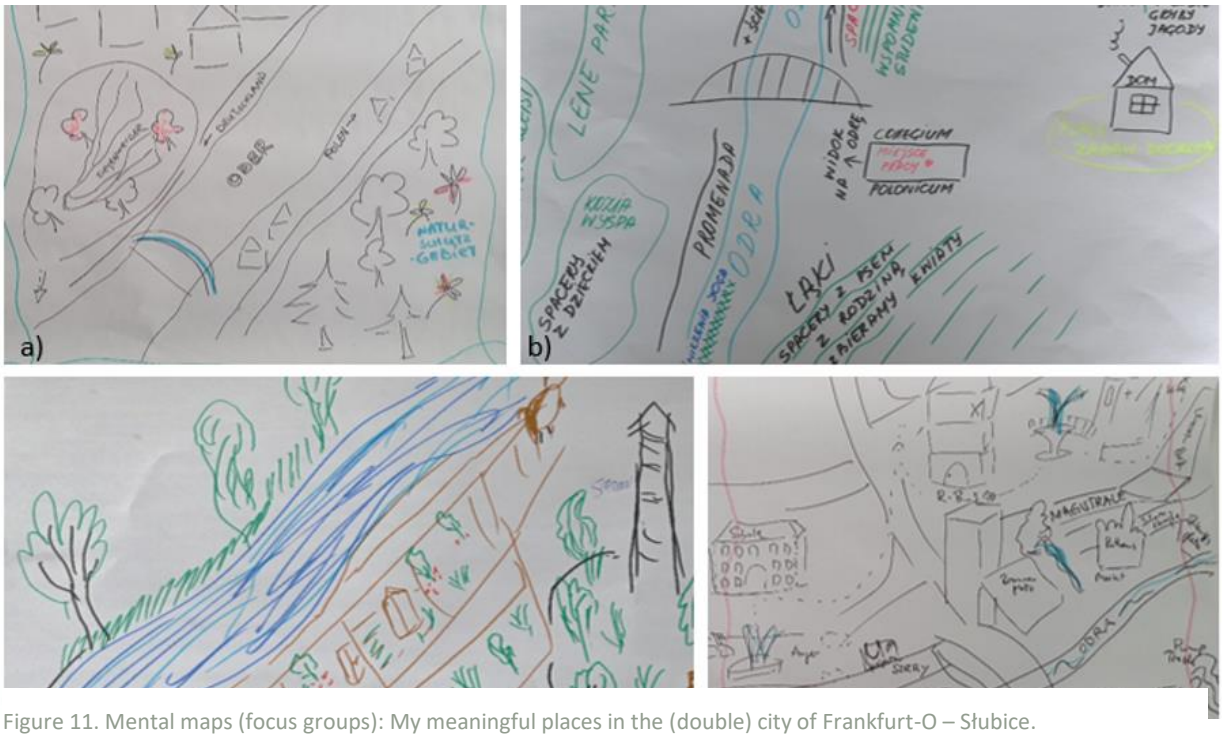

Figure 11. Mental maps (focus groups): My meaningful places in the (double) city of Frankfurt-O – Słubice.

Additionally, we integrated outcomes from public participation workshops on visions for the double-city. The survey allowed respondents to spatially locate their everyday activities, meaningful places and future visions on a map. In May, first results were presented and discussed during a citizen Picknick in Słubice, Poland. Survey participants could register to take part in follow up focus groups. These took place in July and September in Frankfurt-O and Słubice. We used mental mapping technique to discuss meaningful places within the cross-border region. A year prior to our focus groups, the Odra river suffered an ecological catastrophe, the so-called gold algae over-populated the river due to conditions of warm, slow, and relatively salty water. It poisoned thousands of tons of fish and molluscs. Focus groups participants discussed this event, its impacts on their meaningful places, and possible response strategies during the focus groups.

FOR FURTHER INFORMATION:

Visit our website: https://movensense.web.leuphana.de/

Find us on Facebook:
https://www.facebook.com/people/MovenSense/100082870435245/

RESEARCH HIGHLIGHT: BIOCULTURAL DIVERSITY IN FARMING LANDSCAPES OF THE GLOBAL SOUTH

Figure 12. A look inside the book.

In 2023, we could finally finish our empirical data collection on biocultural diversity in our case study area, the Chiqhitania region of eastern Bolivia. Due to the Covid pandemic this was achieved only with considerable delays. This final stretch of data collection included ecological field work on bee ecology and pollen and vegetation studies and it was implemented through a cooperation agreement with the natural history museum "Museo de Historia Natural de Noell Kempff Mercado" and the university "Universidad Autónoma René Moreno" in Santa Cruz. Besides that, most work this year was dedicated to handling all the empirical data that were collected. This included data preparation, data analysis and the beginning write up of the results.

Importantly, we can report the publishing of four literature reviews that we have been working on over the last years. This includes reviews on biocultural approaches to sustainability in the Spanish literature, on indigenous and traditional local knowledge, on plural economies and on the role of ecology for food sovereignty.

BioKultDiv is a transdisciplinary project and we are engaging with local communities and actors through our research particularly in our case study area. As part of this engagement, we jointly published a book that compiles stories around the live with bees in our case study communities. The book collects carefully edited anecdotes, a myths, stories, and recipes that involved bees or honey. Bees, honey collection and honey play a culturally important role in the everyday lives of local people in the Chiquitania. The stories were complemented with portraits of the narrator and illustrations. This book aims at maintaining indigenous, local and traditional knowledge of the region and to produce project results that are relevant beyond the academic realm.

FOR FURTHER INFORMATION:

References:

Comunidades indígenas 16 de Marzo Cordillera y San Juan de Lomerío. (2023). Historia de nuestra vida con las abejas y sus mieles.

Links:

Blog post about the book:
https://www.bioculturaldiversity.de/giving-back-to-the-communities-stories-of-our-lifes-with-the-bees-and-their-honey-a-book-about-biocultural-diversity-2/

Publications: https://www.bioculturaldiversity.de/publications/

SOCIAL-ECOLOGICAL SYSTEMS: A GLOBAL CONVERSATION

GLOBAL CONVERSATION: SOCIAL-ECOLOGICAL SYSTEMS ACROSS THE LAND-SEA INTERFACE

It is evident that new perspectives are necessary to adequately address pressing environmental challenges affecting coastal and marine ecosystems. Questions of climate change mitigation and adaptation, biodiversity conservation and food security transcend the land-sea divide. Terrestrial and marine ecosystems are functionally seamless but with particular human benefits accruing in extensive coastal zones. Yet, in the narrative of a blue economy, the oceans are often portrayed as vast frontier spaces, ripe for economic exploitation, sites for future energy supply and food production, with little regard for the impact of existing and future human activities on marine ecosystems. The ocean continues to be viewed as a space apart, separate from the land. Indeed, despite recognition of the need for integrated perspectives,

terrestrial and maritime policies remain distinct and separate, each with their own institutional logics and governance regimes. Despite the development and application of interdisciplinary, cross-sectoral management approaches such as integrated coastal zone management (ICZM) and ecosystem-based marine spatial planning (MSP), management initiatives often fail to cross the land-sea divide and integrated social-ecological perspectives are the exception rather than the rule. What scientific research is needed to provide the basis for the sustainable development and regeneration of complex coastal social-ecological systems in a changing climate?

Drawing on their research work and on recent practices in both Europe and Africa, Cormac Walsh and Louis Celliers, reflected on the inherent limitations of current practices and how social-ecological systems thinking might contribute to more integrated perspectives in applied research, policy and practice.

FOR FURTHER INFORMATION:

References:

Celliers, L., Costa, M. M., Williams, D. S., & Rosendo, S. (2021). The 'last mile' for climate data supporting local adaptation. Global Sustainability, 4. DOI: 10.1017/sus.2021.12.

Celliers, L., Rosendo, S., Costa, M. M., Ojwang, L., Carmona, M., & Obura, D. (2020). A capital approach for assessing local coastal governance. Ocean & Coastal Management, 183. DOI: 10.1016/j.ocecoaman.2019.104996.

Walsh, C. (2019) Integration of Expertise or Collaborative Practice? Coastal Management and Climate Adaptation at the Wadden Sea, Ocean and Coastal Management, 167, 78-86 DOI: 10.1016/j.ocecoaman.2018.10.004.

Walsh, C. (2021). Transcending Land-Sea Dichotomies through Strategic Spatial Planning. Regional Studies, 55(5), 818-830.DOI: 10.1080/00343404.2020.1766671.

GLOBAL CONVERSATION: TRADITIONAL ECOLOGICAL KNOWLEDGE

In May 2023, SESI hosted a global conversation on traditional ecological knowledge, also known as TEK. The online conversation was well attended, with participants from many different parts of the world. A particular focus of the session was what Hartel and colleagues called “the TEK conundrum”. This conundrum describes that traditional ecological knowledge is sometimes romanticized by ecologists because it benefits ecosystems – but local people may, in some cases, not use their traditional knowledge because they highly value it, but rather because they have no other options. The conversation thus called for critical reflections on the role of TEK, including how it is maintained, why it may be lost, and what the role of local people and their agency is in the context of maintaining TEK. To facilitate a truly global conversation, four short presentations provided an initial input for discussions. Joern Fischer presented an overview of the TEK conundrum. Girma Shumi highlighted the importance of TEK for the livelihoods of local communities in southwestern Ethiopia. William Apollinaire discussed the loss of TEK knowledge in rural landscapes of Rwanda, including its implications for knowledge on medicinal plants. Finally, Tibor Hartel reported on the TEK conundrum for southern Transylvania – where many farmers would like to intensify agriculture using modern (not-so-sustainable) methods, but are not in a financial position to do so: and that is why resort to

traditional management practices. The session led to vivid exchange among people from around the world. It highlighted that no two places are the same, and that much more nuance is needed when talking about the value, loss, and maintenance of traditional ecological knowledge. More attention needs to be paid to local people and their intention and values – while traditional ecological knowledge may go hand in hand with sustainable lifestyles and close human-environment connections, it can also signal poverty and a lack of options.

FOR FURTHER INFORMATION

https://www.youtube.com/watch?v=SelXgwWPlB0&t=1092s

References:

Hartel, T., Fischer, J., Shumi, G. & Apollinaire, W. (2023). The traditional ecological knowledge conundrum. *Trends in Ecology & Evolution*, 38(3), 211-214.

GLOBAL CONVERSATION: BLENDING (INSTRUMENTAL ~ INTRINSIC ~ RELATIONAL) VALUES: HOW AND WHY?

On November 2nd 2023, researchers from SESI at Leuphana University of Lüneburg and from the Autonomous University of Madrid hosted a Global Conversation with ca. 70 participants on the co-existence and blending of different values in agroecological, conservation, and restoration practices (Figure 1). They presented the findings of their empirical research on plural values in different social-ecological settings: (1) values expressed by different stakeholders at Mount Kilimanjaro in Tanzania (Milena Gross, John S Julius),(2) values tied to biocultural diversity in farming landscapes in Colombia and in the Chiquitania region in Bolivia (Stefan Ortiz) (based on Ortiz-Przychodzka et al. 2023), (3) values underpinning the agro-ecological practices by new peasantries in Spain (Beatriz Vizuete), and (4) values behind grasslands restoration in Germany (Lukas Kuhn and Miguel Cebrian-Piqueras).

After the presentation of the empirical research, we discussed – in groups – three main topics: (1) the meaning of blending and how and why values appear together as a result of specific practices, such as restoration and agroecological activities, and as a result of social identities; (2) implications of values blending for governance towards sustainable and just systems; and (3) implications of

values blending for methodological designs and the recognition that methods are not completely neutral.

FOR FURTHER INFORMATION:

References:

Ortiz-Przychodzka, S., Benavides-Frías, C., Raymond, C.M., Díaz-Reviriego, I., & Hanspach, J. (2023). Rethinking Economic Practices and Values as Assemblages of More-Than-Human Relations, *Ecological Economics, 211*: 107866.

OUTREACH AND TEAM BUILDING

TEACHING IN THE MINOR SUSTAINABILITY SCIENCES: PINOVA FESTIVAL

Figure 13. Photos illustrating the atmosphere and activities of the PINOVA festival. Top left: Panel discussion on social-ecological restoration of grasslands. Top right: Simultaneous use of different spaces for panel discussion, presentation of the research projects conducted in a traditional orchard in Wendish Evern by the students of module 5. Bottom left: presentation of the scientific posters created by students of module 2, presenting their research design. Bottom right: Graphical design for the invitation to PINOVA festival. Photos by Jan Malte Thomas.

In the context of the Ecological Restoration courses of the Minor in Sustainability Sciences taught by Professors Vicky Temperton and Berta Martín-López, students of the final module "Ecological restoration for sustainability - final module (transdisciplinary project" organized a festival (PINOVA festival) to present their research. The PINOVA festival took place on February 3rd 2023, from 14.00 to 21.00 pm. The program included a variety of activities that allowed participants to discuss restoration practices and their outcomes as well as to enjoy and experience the connection with nature.

Activities included panel discussions, music, meditation, a guided gallery walk, and the screening of the movie 'Die Wiese'. The students of the final module did not only organized the festival, but they also

presented the research activities conducted in the traditional orchard comprising research on species diversity through camera trapping, pollinators and their relations to different understory experiments, and diversity of butterflies and their relation with soil characteristics and plant biomass in the grassland.

FOR FURTHER INFORMATION:

https://www.instagram.com/diewieseunddiewelt/

WHAT HAVE WE DONE AT KILIMANJARO IN 2023?

Figure 14. Outreach tour with Chagga women.

In the context of the DFG project Kili-SES, the SESI team (Milena Gross, John Julius, Jasmine Pearson, Viviane Krail and Berta Martín-López) organized an outreach tour in February 2024 to present the preliminary results. The outreach tour consisted of seven events in which more than 160 people participated. The events targeted local communities,

particularly Chagga women (see Figure 14), Kilimanjaro National Park, students and lecturers of Mweka College, tour guides, tourists and hikers.

Jelke Meyer designed the materials of the outreach tour. Based on postcolonial studies and Gestalt psychology, Jelke Meyer designed four posters presenting the preliminary results in Kiswahili and English. The first poster presented the most important nature's contributions to people (NCP) as identified by farmers, tour guides, nature conservationists and tourists. The second and third posters presented the NCP and values expressed by the different stakeholders through interviews and photo-voice and photo-elicitation. The fourth poster portrayed the most relevant terms used by the stakeholders in a word-mountain (a word cloud with the shape of Kilimanjaro).

Figure 15. Donation of the fundraising to the Cancer Care Center.

On a more personal note, Berta Martín-López made the donation from the fundraising campaign "Climbing Kilimanjaro for Healing Cancer" to the director of the Cancer Care at the Kilimanjaro Christian Medical Center, Dr. Furaha (Figure 15). The donation was used for paying medication, chemotherapy and paying the transport to Dar es Salaam, which is the closest place with radiotherapy.

FOR FURTHER INFORMATION:

https://kili-ses.senckenberg.de

https://www.gofundme.com/f/climbing-kilimanjaro-for-healing-cancer

DANCE YOUR PHD

Figure 16. A screenshot from the Dance Your Ph.D. video by Maria Brück.

The video expresses the PhD thesis of Maria Brück ("Disaggregated analysis of ecosystem services in southwestern Ethiopia"), which analyzes human-nature relationships and equity, through dance. The video has been submitted to the Dance Your Ph.D. contest organized by Science magazine. Here is the link to the YouTube video: https://www.youtube.com/watch?v=UlYDR9L7rrE

A NEW TRADITION WAS BORN

Figure 17. The SESI team in action.

In a fearless attempt to demonstrate the great spirits and fun of SESI researchers, ten brave scientists set out to compete at the prestigious, annual Hochschulsportfest. Our researchers, celebrated by the SESI team at large, ventured to be (probably) the first non-student team to participate, nay win, to earn glory for the institute. Slipping, sliding, stumbling, and riding through obstacle courses (evidence below), Team SESI leveraged wits, competitive spirits, and of course the power of collaboration to dominate two out of four challenges. While, frankly, being dominated in the other two, the staggering conclusion revealed an uncontested victory in the teams age group (uncontested as there were no other non-student teams). Nevertheless, we had a wonderful time and are under the impression to have left a legacy. A legacy that we aim to add upon next year when we return for more glory and to demonstrate, once again, the spirits and fun of SESI researchers.

PUBLICATIONS

SESI publishes across a broad range of journals in ecology and the social sciences. The following list shows publications led or co-authored by **SESI members** in 2023.

1. Alonso-Crespo, I. M., Weidlich, E. W. A., **Temperton, V. M.,** & Delory, B. M. (2023). Assembly history modulates vertical root distribution in a grassland experiment. *Oikos*, *2023*(1), e08886. DOI: 10.1111/oik.08886.
2. Andrade, R., van Riper, C. J., Goodson, D. J., Johnson, D. N., Stewart, W., López-Rodríguez, M. D., **Cebrián-Piqueras, M. A.**, Horcea-Milcu, A. I., Lo, V., & Raymond, C. M. (2023). Values shift in response to social learning through deliberation about protected areas. *Global Environmental Change, 78*, 102630. DOI: 10.1016/j.gloenvcha.2022.102630.
3. **Balas, M., & Abson, D. J.** (2022). Characterising and identifying gaps in sustainability assessments of tourism-a review. *Tourism Management Perspectives, 43*, 101004. DOI: 10.1016/j.tmp.2022.101004.
4. Balvanera, P., Brauman, K.A., Cord, A.F., Drakou, E.G., Geijzendorffer, I.R., Karp, D.S., **Martín-López B.**, Mwampamba, T.H., **Schröter, M**. (2022). Essential ecosystem service variables for monitoring progress towards sustainability. *Current Opinion in Environmental Sustainability, 54*, 101152, DOI: 10.1016/j.cosust.2022.101152.
5. Barth, M., **Jiménez-Aceituno, A.**, **Lam, D. P.**, Bürgener, L., & Lang, D. J. (2023). Transdisciplinary learning as a key leverage for sustainability transformations. *Current Opinion in Environmental Sustainability, 64,* 101361. DOI: 10.1016/j.cosust.2023.101361.
6. Baumann, L., **Riechers, M.**, Celliers, L., & Ferse, S. C. A. (2023). Anticipating and transforming futures: a literature review on transdisciplinary coastal research in the Global South, *Ecosystems and People, 19*, 1. DOI: 10.1080/26395916.2023.2288957.

7. **Benra, F.**, Nahuelhual, L., **Felipe-Lucia, M. R.,** Oh, R. R. Y., Kachler, J., & Bonn, A. (2023). Mismatches in the ecosystem services-wellbeing nexus: A case study for Chilean Patagonia. *Ecosystems and People*, *19*(1), 2224448. DOI: 10.1080/26395916.2023.2224448.
8. **Brück, M.**, **Abson, D. J.**, **Fischer, J.**, & **Schultner, J.** (2022). Broadening the scope of ecosystem services research: Disaggregation as a powerful concept for sustainable natural resource management. *Ecosystem Services*, *53*, 101399. DOI: 10.1016/j.ecoser.2021.101399.
9. **Brück, M.**, **Fischer, J.**, Law, E., **Schultner, J.**, & **Abson, D. J.** (2023). Drivers of ecosystem service specialization in a smallholder agricultural landscape of the Global South: A case study in Ethiopia. *Ecology and Society*, *28*(3), art1. DOI: 10.5751/ES-14185-280301.
10. Burke, L., **Díaz-Reviriego, I.**, **Lam, D. P.**, & **Hanspach, J.** (2023). Indigenous and local knowledge in biocultural approaches to sustainability: A review of the literature in Spanish. *Ecosystems and People*, *19*(1), 2157490. DOI: 10.1080/26395916.2022.2157490.
11. Caniglia, G., Freeth, R., Luederitz, C., Leventon, J., West, S. P., John, B., Peukert, D., Lang, D. J., von Wehrden, H., **Martín-López, B.**, Fazey, I., Russo, F., von Wirth, T., Schlüter, M., & Vogel, C. (2023). Practical wisdom and virtue ethics for knowledge co-production in sustainability science. *Nature Sustainability*, *6*(5), 5. DOI: 10.1038/s41893-022-01040-1.
12. Castro, A. J., Otamendi-Urroz, I., Quintas-Soriano, C., Suárez Alonso, M. L., Vidal-Abarca, M. R., & **Martín-López, B.** (2023). Repensar la conexión con la naturaleza a través de las emociones. *Ecosistemas, 32*(especial), 2502. DOI: 10.7818/ECOS.2502.
13. **Cebrián-Piqueras, M. A.**, Palomo, I., Lo, V. B., López-Rodríguez, M. D., Filyushkina, A., Fischborn, M., Raymond, C. M., & Plieninger, T. (2023). Leverage points and levers of inclusive conservation in protected areas. *Ecology and Society, 28*(4), 7. DOI: 10.5751/ES-14366-280407.

14. Comunidades indígenas 16 de Marzo Cordillera y San Juan de Lomerío. (2023). Historia de nuestra vida con las abejas y sus mieles.

15. **Duguma, D. W.**, Law, E., Shumi, G., Rodrigues, P., Senbeta, F., **Schultner, J.**, **Abson, D. J.**, & **Fischer, J.** (2023). Spatial predictions for the distribution of woody plant species under different land-use scenarios in southwestern Ethiopia. *Landscape Ecology*, *38*(5), 1249–1263. DOI: 10.1007/s10980-023-01614-0.

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21. Ghosh, A., Sen, A., & **Frietsch, M.** (2023). "What is a 'very severe cyclone' please"? Uncovering knowledge and communication gaps in climate resilience realities. *International Journal of Disaster Risk Reduction*, *86*, 103499. DOI: 10.1016/j.ijdrr.2022.103499.

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conserving connectivity across a large protected area network. *PLOS ONE*, *18*(10), e0292918. DOI: 10.1371/journal.pone.0292918.

23. Goodson, D. J., van Riper, C. J., Andrade, R., Stewart, W., **Cebrián-Piqueras, M. A.**, & Raymond, C. M. (2023). Broad values as the basis for understanding deliberation about protected area management. *Sustainability Science*. DOI: 10.1007/s11625-023-01423-z.

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33. Kiffner, C., Giliba, R. A., Fust, P., **Loos, J.**, & Waltert, M. (o. J.). Assessing protected area effectiveness in western Tanzania: Insights from repeated line transect surveys. *African Journal of Ecology*, *61*(4), 966-979. DOI: 10.1111/aje.13200.

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systematic literature review. *Discover Sustainability*, *4*(1), 26. DOI: 10.1007/s43621-023-00141-x.

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urban gradient in Bengaluru, India. *Ecosystems and People*, *19*(1), 2223307. DOI: 10.1080/26395916.2023.2223307.

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PEOPLE

David Abson (secondary affiliation), Professor of Sustainable Resource Use. I am an interdisciplinary scientist working at the intersection of the natural sciences and economics. I focus on land use change, ecosystem services, systems thinking and transformative changes in social-ecological systems.

Mareike Andert, Master's student and editor of the SESI Blog. I'm passionate about sustainable mobility, climate justice, climate communication, transformation and participation processes and love to write and discuss about those topics.

Isabelle Andres, Bachelor's student and responsible for the SESI Blog "ideas4sustainability" and social media. In my studies, I have placed a focus on ecology and biodiversity as well as science communication because I later on wants to work as a journalist.

Martin Balaš, Research Associate and PhD Student (based at Eberswalde University for Sustainable Development). My research is focused on indicator development for social and ecological assessment of tourism, with a particular focus on the impacts of tourism in biosphere reserves.

Camila Benavides-Frias, Research Associate and PhD student. I am an agro-ecologist. My research is part of a transdisciplinary project on biocultural diversity, I focus on agroecosystems functioning (integrating social and biological components) and linking it to sustainability topics such as food sovereignty.

Felipe Benra, Postdoctoral researcher. I am conservation scientist with a background in environmental engineering. I developed my PhD in mapping and modeling ecosystem services in southern Chile looking at distributive and inequality issues and policy development. I am generally interested in sustainability sciences and restoration.

Maria Brück, Research Associate and PhD student. I am a sustainability scientist with a background in economics. My PhD work focuses on equity issues related to land use change and ecosystem services in southwestern Ethiopia.

Miguel A. Cebrián-Piqueras, Senior researcher. My research interests include community-based conservation, plural valuation, human-nature connectedness, and transdisciplinary approaches. I am currently working on a project that researches the applicability of transdisciplinary research to navigate diverse typologies of nature values to enhance social-ecological restoration.

Magdalena von Creytz, Project Assistant. I coordinate administrative processes and budget management, and maintain the social media platforms and website of the project "Biocultural Diversity in Farming Landscapes of the Global South".

Caroline Hélène Dabard, PhD student. My research focuses on small-scale innovations and their transformative potential in rural to peri-urban Biosphere Reserves. I thereby integrate content analysis, clustering techniques, network analysis and spatial perspectives on how, where and why sustainability innovation develop - and with which impact.

Isabel Díaz Reviriego, Postdoc Researcher. My research focuses on the role that social relations and social difference play in shaping environmental governance and in the plurality of understandings and practices of human-nature relationships (biocultural diversity) and ways of living with biodiversity.

Annika Drews-Shambroom, Project Coordinator. I am in charge of the administrative and team processes, budget, website and social media in the research project "Biocultural Diversity in Farming Landscapes of the Global South".

Dula Wakassa Duguma, Research Associate. My research focus is on land use change, biodiversity and ecosystem services in social-ecological systems in the Global South. Currently, I am working in an interdisciplinary research project in Ecosystem Restoration in Western Rwanda.

Joern Fischer, Professor of Sustainable Landscapes. I have a background in landscape ecology and work at the intersection of social and ecological systems. I am particularly interested in biodiversity conservation, food security, and sustainable development in the Global South.

Marina Frietsch, Research Associate and PhD Student. I am a sustainability scientist with a background in landscape ecology and nature conservation. My work is based on social-ecological systems thinking and focuses on the restoration of degraded ecosystems.

Richard Giliba, PhD Student in Ecology. I am a spatial ecologist. My research is part of a transdisciplinary project on wildlife, values, and justice. I focus on understanding wildlife and land cover responses to different biodiversity governance in southern African protected areas.

Sarah Gottwald, Postdoctoral researcher. My background is in geography and landscape planning. My research focuses on the relation between senses of places and mobilities in borderscapes. I am interested in the application of participatory mapping methods.

Konrad Gray, PhD student. I am a sustainability scientist with an interdisciplinary background in human-nature relationships. My work deals with the social-ecological system of grassland restoration. In my PhD I want to explore different relationships and relational properties in a transdisciplinary approach to grassland restoration in the context of a real-world laboratory.

Milena Gross, Research Associate and PhD Student. I am a sustainability scientist aiming to unravel how people are connected with and value nature as well as how natures contribute to people's quality of life.

Jan Hanspach, Junior Research Group Leader. I have a background in ecology and conduct interdisciplinary work on biocultural diversity in the global south as well as on the integration of biodiversity conservation in farming landscapes. In 2021, I received the Leuphana Young Researcher Award.

Gudrun Harms. I am responsible for all secretarial and administrative work, financial processing, budget monitoring and the preparation of employment contract matters at the Social-Ecological Systems Institute.

Roman Isaac, Research Associate and PhD Student. I am interested in the role of governance in human-nature interactions. More specifically I focus on the multi-level governance of natural and anthropogenic capitals in the co-production of ecosystem services.

Amanda Jiménez Aceituno, Researcher. My research seeks to explore ways to operationalize transformations theory into analytical frameworks and participative and art-based methods that can improve sustainability practice. Currently I explore how co-designed processed can contribute to sustainable transformations of the food system in drylands.

Rhoda Nthena Kachali, Research Associate and PhD Student. I am particularly interested in the interface between people and nature and how a better understanding of these interactions can enhance protected area effectiveness and capabilities among people living in and around them.

John Sanya Julius, Research Associate and PhD Student. I am a social environmentalist interested in sustainability management and socio-ecological systems. I focus on understanding how human-nature interaction with existing Indigenous and Local Knowledge can influence the demand for and value of nature contribution's to people.

Sasha Kosanic, Senior Lecturer at Liverpool John Moores University. My research focus is on climate change, ecosystem services and how changes in the environment impact marginalised populations (i.e., People with Disabilities, Indigenous People), their well-being and progress towards sustainable futures. I am currently working on a project investigating the demand for and availability of NCP in Biosphere reserves.

Lukas Kuhn, Research Associate and PhD Student. I am a sustainability scientist with a special interest is understanding why people and groups of people do what they do. My research focusses on the diverse values and value compositions that motivate the sustainable use and restoration of grasslands in Germany.

David P. M. Lam (visiting scholar), Scientific Director of the project tdAcademy - Platform for transdisciplinary studies and research. I work on transdisciplinary research methods, processes to increase the impact of sustainability initiatives, and the role of indigenous and local knowledge in change processes.

Elizabeth Law (external consultant) Statistics and Modelling Advisor. My research focuses on effective, efficient, and equitable biodiversity conservation and environmental management. I evaluate evolving incentives for conservation, and develop tools for effective conservation and environmental management in complex socio-ecological systems.

Aymara Victoria Llanque-Zonta, Research Associate and lecturer. I am interested in food justice and sustainability, with special emphasis on feminist and decolonial studies connected to sustainable consumption, co-production of knowledge with peasant and indigenous communities, transdisciplinary and transformations in science, politics and practice.

Jacqueline Loos, Robert-Bosch Junior Professor for Research into the Sustainable Use of Natural Resources. I research environmental justice in development and biodiversity conservation, applying a social-ecological understanding of protected areas to scrutinize interdependencies between governance arrangements, management effectiveness and social-ecological outcomes.

Berta Martín-López, Professor of International Sustainable Development and Planning. Her research is collaborative, inter- and transdisciplinary aiming to understand the role of values, knowledge, and institutions in supporting transformation pathways to sustainability.

Verene Nyiramvuyekure, PhD student at the Institute of Ecology and the Socio-Ecological Systems Institute. My research focuses on the impact of ecosystem restoration intervention on biodiversity in the restored landscapes.

Stefan Ortiz Przychodzka, Research Associate and PhD student. I am an Ecological Economist with experience in transdisciplinary research with peasant and indigenous communities. I work on topics related to biocultural diversity, agrarian change and social-environmental conflicts.

Francy Daniela Alba Patiño, from the University of Almeria, Spain, visited on a research stay during September 2023. The aim of my research stay was to work on the manuscript of a global systematic review on the role of Socio-Ecological Systems (SES) research to analyse and understand human-wildlife conflicts.

Jasmine Pearson, Postdoc researcher. My research interests include nature valuation, Indigenous and local knowledge (ILK) systems, gender equity and sustainable livelihoods. I am currently working on a project which seeks to elicit the demand and values of nature´s contributions to people at Mt Kilimanjaro, Tanzania.

Manuel Pacheco-Romero, postdoctoral researcher (Margarita Salas Postdoctoral Fellow, Ministry of Universities, Spain). My research focuses on understanding social-ecological factors driving success or failure of ecosystem restoration actions. I am

conducting post hoc assessments of restoration activities in grasslands (Germany) and Mediterranean ecosystems (Spain).

Maraja Riechers, Postdoc researcher. My research interests include leverage points for sustainability transformation, especially in the domain of human-nature relations, including human-wildlife conflicts, and land-use changes.

Paula Rodríguez, my project focuses on understanding livestock management in South Patagonia's subantarctic forests. Using a social-ecological approach and place-based research, the aim is to uncover sustainable strategies for rural landscapes in the face of global changes and local challenges.

María D. López Rodríguez, Postdoc researcher at University of Almería, and visiting researcher at SESI. My research focuses on designing and analysing innovative transdisciplinary research methods to support the organisation and mobilisation of actors for collective action in social-ecological governance.

Lena Rölfer, PhD Student. I am a research associate at the Climate Service Center Germany (GERICS), Helmholtz-Zentrum Hereon. I have a background in environmental science and marine ecology and am particularly interested in inter- and transdisciplinary approaches for coastal social-ecological systems that advance sustainable and climate resilient coastal governance.

Patricia Santillán Carvantes, Research Associate and PhD Student. My project aims to co-design sustainable management strategies that foster biodiversity conservation, nature’s contributions to people, and farmers' good quality of life in the context of a tropical dry forest socio-ecological system.

Felix Schaaf, Master's student and responsible for the SESI website as well as the project website ecosystemrestoration.net. I'm interested in transformative governance and law. Currently, I work on climate adaptation, water governance and sustainable agriculture.

Tamara Schaal, Research Associate and PhD Student. I am a social scientist interested in understanding perceptions of local people and communities related to biodiversity as well as land use and implications for policy and governance.

Matthias Schröter-Vinke (visiting fellow). I am an environmental scientist with a broad interdisciplinary background, including landscape ecology, conservation biology, ecological economics and environmental ethics. I am interested in spatial ecosystem service assessments, social-ecological systems, and the science policy-interface of ecosystem services.

Dr. Jannik Schultner (visiting fellow), Researcher in rural social-ecological systems. I am interested in human-environment interactions, including ecosystem services, human-wildlife conflicts, biodiversity conservation, land use and rural livelihoods, and in mixed methods.

Ping Sun, PhD student. My academic research interests are the application of environmental information technologies in landscape connectivity, biodiversity and biogeography research.

Vicky Temperton (secondary affiliation), Professor of Ecosystem Functions and Services. I have a background in experimental plant ecology and test ecological theories and knowledge for its potential to improve ecological restoration in a global change world.

Pramila Thapa, Research Associate. I am a sustainability scientist with previous training in inter- and transdisciplinary studies. My current research aims to synthesize the gradient of value interactions in farming and conservation settings across multiple countries.

Beatriz Vizuete, PhD researcher at the Social-ecological Systems Laboratory (UAM). My research interests include back-to-the-land movements, agroecology, values of nature, and gender equity. I am currently leading a project on the role of new women farmers in agroecological initiatives.

COURSES TAUGHT BY SESI

SESI members teach a diversity of subjects at the Bachelor, Master and PhD level. These include:

- A social-ecological systems approach to ecosystem restoration around the world
- African protected areas at the crossroads between justice and conservation
- Basics of Inter- and Transdisciplinarity
- Basics of Sustainable Development
- Balancing ecological and social elements in the spatial design of environmental policy
- Biodiversity of insects and conservation planning
- Ecological Restoration for Sustainability
- Ecosystem functions and services
- Environmental Sciences - an Introduction
- Fundamentals of Sustainability Economics
- Impact of climate change on ecosystems
- Social-ecological systems thinking to integrate food security and biodiversity conservation
- The Economics of Biodiversity and Ecosystem Services
- Conservation ecology
- Ecological Restoration for Sustainability
- Our Present and Future Nature: An Analysis of the Book "Rambunctious Garden" by Emma Marris
- Public Participation GIS (PPGIS) for surveying and evaluating human-environment relations on campus
- Restoration of Biodiversity in Urban Settings - the Leuphana Campus
- Sustainability and Space
- Sustainability Science

THESES COMPLETED IN 2023

The following theses were completed in 2023 after supervision or co-supervision by SESI members.

PHD THESES

- **Martin Balas: Meaning and managing sustainability impacts of tourism form a subnational perspective**

  The emergence of sustainability as a guiding principle for tourism development came along with needs to introduce instruments that can monitor the actual impacts of tourism. This dissertation aims to contribute to a deeper understanding of the implementation and performance of sustainability assessments, by linking transformative needs of tourism with necessary assessment approaches that can serve as effective instruments for a shift towards a more sustainable tourism development. Thus, the research is part of recent efforts to establish profound and effective measurement approaches for sustainable tourism. The thesis empirically evaluates and applies different measurement approaches in specific destinations, with the help of quantitative and qualitative data collection methodologies. The findings indicate that assessments will be more successful in terms of serving as tools for decision-making, if they tackle main drivers of change and encourage management or policymakers to take decisions that affect multiple sustainability issues. In general, the thesis provides further clarification about key environmental end socio-economic measurement methodologies, which supports ongoing debates about sustainability impacts of tourism. Thus, the research contributes to knowledge, frameworks, methodologies and practical application for tourism governance and tourism sustainability science.

— **Maria Brück: Disaggregated analysis of ecosystem services in southwestern Ethiopia**

Following calls for necessary improvements in response to remaining gaps in ES research, especially regarding the integration of equity issues in ES assessments, this dissertation puts forward disaggregation as a tool to better assess and address equity issues in ES research and decision-making. It addresses the following overarching research question: "How can disaggregated analyses of ES help to better assess and address equity implications of ES provision and appropriation in both research and decision-making?" More specifically, this dissertation formulates three research aims: (1) to explore theoretical and methodological approaches to ES disaggregation, (2) to empirically examine ES disaggregation along different dimensions in an Ethiopian case study region, and (3) to develop an approach to decision-making that integrates results of ES disaggregation. This dissertation follows a place-based, social-ecological systems research approach using a case study in southwestern Ethiopia. The contributions of this dissertation ultimately help to align ES research and decision-making with equity, as well as with sustainability as an overarching normative goal. The results and insights derived in this dissertation can inspire future research.

— **Patricia Santillán Carvantes: Linking biodiversity, nature's contributions to people, and good quality of life: insights from tropical dry secondary forests in Mexico**

Through the lenses of the social-ecological systems (SES) approach, I investigate the connections between biodiversity, nature's contributions to people (NCP), and human quality of life (QoL) in a tropical dry forest (TDF) of Mexico. First, a literature review was performed on the social-ecological indicators for the last 11 years in the Chamela-Cuixmala region

to propose and operationalize a social-ecological framework. The framework is simultaneously context-specific and operationable across global contexts, providing an opportunity to inform discussions on global sustainability from local contexts. Second, this thesis uses social-ecological information to identify social-ecological systems units (SESU) spatially explicitly. A methodology was provided to spatially identify the components of social-ecological systems that environmental conditions and management practices have shaped at three relevant decision-making scales: plots owned by individuals, plot owners, and governance units. Finally, the thesis examines the self-perceived QoL across the different SESU. We found that emphasis was put on economic capital to achieve QoL. We discuss the need for governance structures promoting smallholders´ worldviews that move beyond utilitarianism and foster commons. The testing of new frameworks and methodologies of this thesis represent important steps towards unraveling the connections between biodiversity, NCP, and QoL and contribute to achieving sustainable scenarios.

— **Dula Wakassa Duguma: Biodiversity and ecosystem services under different future land-use scenarios in southwestern Ethiopia**

Tropical ecosystems are critical for biodiversity conservation and local people's livelihood sustenance. However, these ecosystems are under high pressure from land-use and land cover (LULC) change, which is further projected to intensify and increase rapidly, thereby affecting biodiversity and the provisioning of vital ecosystem services (ES). It is thus important to understand how LULC might change in the future and how such changes could affect biodiversity and ES provisioning in a given landscape of tropical ecosystems. In this dissertation, I examined the future of biodiversity and ES provisioning for four plausible land-use scenarios in southwestern Ethiopia. Overall, the findings of this dissertation showed the importance of integrating future land-use mapping with participatory, narrative-based scenarios to assess the social-ecological

outcomes of alternative futures. Scenarios of large-scale agricultural intensification point to a potentially high loss of biodiversity and ES that could have a negative long-term impact on ecosystems and human well-being. Finally, the 'Coffee and conservation' scenario, which involves the creation of a new biosphere reserve, appears to be the most sustainable scenario that could result in a sustainably managed, diversified landscape which could make major contributions to biodiversity conservation and human well-being in the region and beyond.

— **Lena Rölfer: System and transformative knowledge for enhancing the resilience of coastal social-ecological systems to climate change**

This dissertation contributes to research on generating actionable knowledge for coastal governance to enhance the resilience of coastal SES to climate change. It does this by providing theoretical, methodological and empirical insights on three research questions: 1) what is a more actionable concept for applying the concept of resilience in coastal governance?; 2) what methods and approaches are suitable to generate actionable knowledge for coastal governance?; and 3) what obstacles to knowledge co-production exist for Early Career Researchers and how can they be overcome? The methods applied in this dissertation include stakeholder analysis, social network analysis, capital approach, fuzzy cognitive mapping and leverage points analysis, which were tested in a case study in Algoa Bay, South Africa. Key findings suggest that system and transformative knowledge are particularly important when applying the concept of resilience in coastal governance to generate actionable knowledge. The proposed methods contribute to both system and transformative knowledge by revealing stakeholder capacities, facilitating knowledge exchange, identifying weak governance processes, and suggesting actions to enhance the resilience to climate change. Implications for stakeholders include recommendations for

information sharing, human capital reinforcement, and an integrated approach to climate change adaptation in coastal planning.

Tamara Schaal: Navigating biodiversity conservation trade-offs in the social landscape: Understanding stakeholder perspectives and aspirations

The global loss of biodiversity has been widely studied, yet it has many different facets depending on the context. Engaging with and addressing contextual understandings of biodiversity is vital to develop socially palatable solutions for biodiversity loss. This dissertation, therefore, takes a place-based approach to studying biodiversity conservation trade-offs and seeks to understand how the perspectives and aspirations of different stakeholders shape them. First, it aims to identify shared viewpoints as ensembles of perceptions and meanings about human-nature relations and biodiversity. Second, it aims to understand how biodiversity is valued and constructed in stakeholders' aspirations towards their landscape. To this end, a convergent mixed methods approach and case study design are used. Two cases were selected that face different underlying drivers of land-use change, resulting in loss of biodiversity. Narratives and discourses provide conceptual lenses through which I study biodiversity conservation trade-offs. The findings highlight that despite some overlap in how stakeholders perceive biodiversity, contrasting problem framings and different biodiversity priorities present hindrances to concerted action to protect biodiversity and for collaboration However, there is polarity and contestation around the role and importance of biodiversity in rural development. In conclusion, this dissertation highlights how people value biodiversity differently based on their relative perspectives, the role of biodiversity in aspirations for the future and what this means for governing the transformative changes needed to address the issue of biodiversity loss.

MASTER THESES

- Do voluntary sustainability standards matter? Exploring social sustainability effects on Mexican organic coffee farmers
- How is biocultural diversity embedded in social ecological systems dynamics: A literature review
- Intergenerational transmission and preservation of Traditional Agroecological Knowledge (TAeK) in a context of outmigration from rural areas in south-eastern Spain
- Leverage Points of Sufficiency Practices and Interventions in Recent Sustainable Housing Research: A Systematic Review of Case Studies
- Living Wages for Rural India: Calculation and Implementation of a Living Wage for Rural Maharashtra
- The invisible hand that shapes climate discourse: Corporations at COP26
- The True Cost Accounting Method as an approach to include positive and negative externalities in business decisions in the food and land use system
- Using mental models to understand the key actors' shared perspective on the UNESCO Schorfheide-Chorin Biosphere Reserve, Germany, as a model for sustainable development

BACHELOR THESES

- A creative approach for social-ecological science communication at Mt Kilimanjaro, Tanzania
- A forest full of values: Exploring foresters' nature values related to their management practices
- An in-depth analysis of highly demanded Nature's Contributions to People in the nexus of conservation and nature-based tourism at Mount Kilimanjaro
- An industry actors' perspective on the barriers to a sustainability transformation of production practices in Europe's surfboard manufacturing industry
- Assessing landscape connectivity and property size effects on riverine landcover distribution: A case study of four rivers in Southern Chile

- Barriers and Drivers in the Implementation of Sufficiency Policies in Germany: Insights from the Federal Ministries BMWK and BMUV
- Challenges and opportunities in the nexus of tourism and conservation: A systematic literature review
- Commoning in action – An analysis of commoning in intentional communities on the example of different housing projects in the city of Lüneburg
- Die Zukunft der landwirtschaftlichen Produktion in Nordostniedersachsen: Eine sozial-ökologische Systemanalyse und eine partizipative Szenarienentwicklung
- Effects of plant functional group order of arrival on soil solution pH and nitrate leaching in a grassland field experiment
- Evaluation des Erfolgs der Renaturierung von Grünland Norddeutschlands anhand der Diversität von Tagfaltern und Widderchen
- Exploring the relationship between Fair Trade and Ecologically Unequal Exchange An analysis along the global value chain of cocoa from West Africa
- Förderung von Bienen (Anthophila) in Blühstreifen: Welche Rolle spielt die Wahl der Blühmischung?
- Impact of the financialization on decoupling economic growth from resource use
- Intersectional effects of the German national CO2 pricing scheme – an intersectionality based policy analysis
- Investigating the plant diversity connection between restored grassland sites and the surrounding vegetation
- Nature's Contributions to People and – understanding the diverse perceptions of stakeholders in the nexus of conservation and nature-based tourism at Mount Kilimanjaro, Tanzania
- Potentiale und Erfolgsfaktoren für die Skalierung von Agroforst-Systemen in Deutschland: Analyse von Praxisbeispielen und Entwicklungsmöglichkeiten
- Priority effects in a grasslands field experiment - How does the order of arrival of plant functional groups influence plant community composition and functioning?

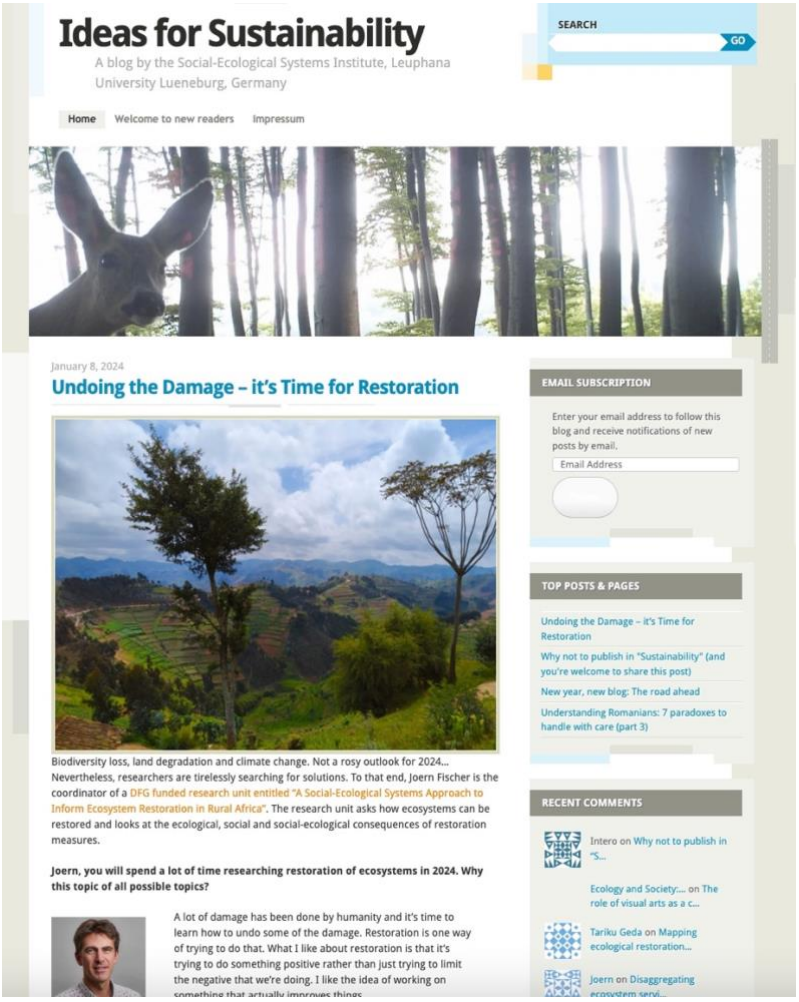
- Rewilding Europe - challenges and opportunities of a new strategy for biodiversity
- The monetary value of the Nyungwe National Park, taking ecosystem services into account
- The valuation of nature by farmers in connection to their agricultural practices
- Uncovering Indigenous and local values of nature through arts-based methods: a systematic review
- Understanding farmers' values for nature: insights from Atewa Landscape, Ghana
- Use and distribution of risks and benefits of carbon offsetting – a political ecology analysis
- Where do all the grasslands go? An analysis of grassland description in the context of climate mitigation

FOR MORE INFORMATION

Visit our website leuphana.de/en/institutes/sesi.html to learn more about us and our work!

You can also follow our institute's news and publications on social media. Many of our papers are featured on our blog ideas4sustainability.wordpress.com soon after publication. You can engage with us on Twitter @SESLeuphana. Recorded talks by SESI members can be found on our YouTube channel Social Ecological Systems Institute SESI.

We thank Felix Schaaf for editing this report, and all of SESI for the collection and contribution of the pieces and photos.



A screenshot of the SESI blog.

IMPRINT
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